Emphysematous pyelonephritis in a diabetic patient

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DESCRIPTION

A 49-year-old man with morbid obesity, hypertension and poorly controlled type 2 diabetes mellitus presented to the emergency department with ongoing shortness of breath, leukocytosis of 26 000/uL, lactate of 5.6 mmol/L and positive urinalysis. Serum creatinine was elevated to 5.9 mg/dL, above a baseline of 1.6 mg/dL. CT scan of the abdomen and pelvis without intravenous or oral contrast demonstrated gas replacing the majority of the left renal parenchyma, tracking inferiorly into the proximal left ureter (figure 1, white arrowhead), with two adjacent subcentimeter stones in the distal ureter (figure 2, white arrow). An emergent left radical nephrectomy was performed. Microscopic analysis of the surgical specimen demonstrated acute pyelonephritis with extensive necrosis and minimal viable tissue. Intraoperative cultures grew *Klebsiella pneumoniae*. The patient was discharged home in stable condition on postoperative day 6 to complete a course of culture-specific antibiotics. He was last seen in follow-up 5 months from surgery by his primary care provider and was doing well.

Emphysematous pyelonephritis is an aggressive necrotising renal infection, seen predominantly in diabetics. It is caused by gram-negative gas-forming organisms, most commonly *Escherichia coli*, as well as *Klebsiella* and *Proteus* species.¹ It is a urologic emergency that carries high morbidity and mortality. CT is highly accurate for diagnosis. A radiologic classification system based on CT findings may help guide treatment.² In this scheme, when there is viable renal parenchyma, first-line therapy consists of antibiotic therapy, fluid resuscitation, and glycaemic control, with percutaneous renal drainage, with or without ureteral stenting, usually performed as well.³ While favourable

Figure 1 Coronal non-contrast-enhanced image through the abdomen demonstrates diffuse gas within the left renal collecting system and ureter (arrowhead).

Figure 2 Coronal non-contrast-enhanced image through the abdomen at a level slightly posterior to figure 1 redemonstrates diffuse emphysema of the left renal collecting system as well as two small obstructing stones in the distal ureter (arrow), with marked associated periureteral inflammatory fat stranding.

outcomes have been reported with non-invasive therapy alone,⁴ studies demonstrate significantly decreased mortality in patients treated with percutaneous drainage.⁵ In the setting of diffuse and severe infection, with findings of extensive parenchymal destruction on CT and/or absence of functional kidney demonstrated on nuclear medicine renography, or when there is a failure to respond to first-line treatment, nephrectomy may be indicated.^{1 3 6}

Learning points

- ▶ Emphysematous pyelonephritis is a life-threatening infection seen in patients with diabetes and is caused by gas-forming organisms such as *Escherichia coli* and *Klebsiella* and *Proteus* species.
- ▶ It is an emergency that requires prompt management with antibiotics, fluid resuscitation, glycaemic control, and percutaneous drainage, with possible ureteral stenting. Nephrectomy may be required in severe cases.

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